Webinar: Applied Hydrodynamic Modelling – Part 1

#	Question	Answer
1	Nathaniel from Auburn University, USA. Why is curvilinear grid better than rectangular grid in EFDC hydrodynamic models? Please, help with some comparative paper references if any?	Hi Nathaniel, I can't comment on EFDC specifically as I haven't used it before. However, both curvilinear and flexible mesh models are designed to help represent complex coastal (or river geometry). With both curvilinear and flexible mesh models you can align your mesh with the flow patterns and use less cells (and thus ofter run faster) than a rectangular mesh. The model that both Emma and Paul are showing today (TUFLOW FV) is a flexible mesh model that is comprised of triangles and quad elements.
2	how long takes this study? and how many people are involved into?	live answered
3	Is this a 2D model or 3D model?	live answered
4	Does salinity in the model accounts for Na and Cl only, or is actually the TDS?	Hi Leonardo, when referring to salinity results the model is conserving the mass of salt. So it's the mass of dissolved NaCl in each model 3D cell.
5	How did you validate your numerical results? was the results compared to for example experimental data? Thanks.	live answered
6	How did you validate your numerical results? was the results compared to for example experimental data? Thanks.	live answered
7	How did you validate the model in terms of nutrient transport and mixing of salinity and oxygen?	This was answered live. Thanks for your question Hengyu.
8	How does the model address the impact of polutants carried by runoff during wet weather events from urban areas in the vicinity of the channels?	live answered
9	So the salinity with industrial discharge (40 g/l) is lower than the salinity conc. without the industrial discharge (45 g/l)? Interesting...Is the industerial discharge treated?	Hi Ahmed, the ambient salinity in the channel and around Abu Dhabi is very high as you mention. There are very high evaporation rates in the region. There is some primary treatment of the discharge. We can follow up with further details on this for you.
10	I wonder how the horizontal and vertical dispersion of the pollutant was explained to the trainees? I suppose it is a key parameter, depending on the natural process properties and modelling (mesh resolution) ?	Yes, TUFLOW FV can use a range of different dispersion models and parameters. We selected models to suit and used data to calibrate accordingly. Setting of dispersion parameters should always be done using data. Sensitivity tests were completed to show the attendees the affect that vertical and horizontal mixing parameters could have on model results. It was recommeded for future studies that where possible field measurement could be undertaken to imrpove the reliability of results.
11	Hi, this is Aragorn Inocencio from AMH Philippines. In connection to other questions about validation, how many locations were used for validation?	We had several monitoring stations that recorded water quality parameters and additionally used the local tide guages in the area. For Mussafah Channel there were two located within the domain and the wider Abu Dhabi model there were 10 locations.
12	Hi, this is Aragorn Inocencio from AMH Philippines. In connection to other questions about validation, how many locations were used for validation?	Hi Emma, thanks for the clarification.
13	Thank you, Emma. Please, does your TUFLOW Model take into consideration the possible aquatic vegetation in the water environment?	Thanks Nathaniel. The model can take into account the drag assicated with vegetation, and can take into account the nutrient uptake, although not dynamically. We will be able to grow and decay macrophytes in subsequent releases of the WQ Module.
14	Hi, I am currently a graduate student interested in learning TUFLOW. Could you suggest where I could start learning it? Could you suggest some seminars regarding the software? Thank you.	Hi there :) A good place to start is the free TUFLOW FV Tutorial Modules >> https://fvwiki.tuflow.com/index.php?title=Main_Page and https://fvwiki.tuflow.com/index.php?title=Tutorial_Model_Introduction. If you have any questions please get in contact via support@tuflow.com.

#	Question	Answer
15	How deep is this geological map? Sorry...I can't quite get the depth from the map legend?	Hi Ahmed, thanks for your question. I'll ask Paul to answer this one.
16	Can Tuflow deal with cohesive sediment?	Hi Ismael, yes. TUFLOW FV can model multple sediment fractions. These can be either cohesive or non-cohesive. Importantly both cohesive and non-cohesive sediments can be run together in the same model simulation. So from silts, muds, clays, through to sands, gravels and cobbles.
17	Can Tuflow deal with cohesive sediment?	Hi Mitchel, thanks for the reply. So, for example, for 1 cu.m. of bed sediment I can set how much is clay, silt, etc? Yes you can.
18	Thanks for your talk Emma - just wondering if you also looked at DO in % saturation and if not, what your rationale was?	live answered
19	Can the effects of a silt curtain during dredging be modelled?	live answered
20	how do we know the plume source rate is correct? I may have missed the explanation	live answered
21	I am Tesfa from University of South Australia would Tuflow be applicable for watershed sediment modeling	Hi Tesfa, you can use direct rainfall modelling. However, for sedimetn and polutant loads from the catchment we tend to use a hydrologic/source generation model to provide point sources at catchment outlets to the receiveing hydrodyanmic model.
22	For the evolution of terminal/or connected to surfac water systems) pit lakes (old mine voids with water), is TUFLOW the best model software or are other packages better? Dies it integrate with Groundwater at all?	Hello, I can't really comment on other software packages. However, I can say that TUFLOW FV does a very good job at representing the vertical stratifcation you might see in a mine pit. It can also be used to model hydrodyanmic and water quality behaviour between water bodies. I'd recommend checking out the AWS webinar on modelling Lakes as this may be of interest. At the moment we can certainly use inflow or outflow boundary conditinos from groundwater models. We don't dynamically integrate with groundwater models but this is something we have in our development pipeline.
23	In Nepal, around 500 m up the stream banks are erosion problem by high stream water velocity, around down stream to 500 m deposition problems, how can selecte the appropritate sediment and flood model, please suggest.	Yes, this is a complex situation. The selection of the model really depends on the question you are trying to answer. If you're wanting to model very long systems (for example 10s to 100s of kilometers) a 1D model with sediment scour enabled may be a good place to start. You may then want to look in more detail at specific areas in 2D with a more detailed coupled hydrodynamic/sedment transport model where the bed is dynamically updated during an event. Please take a look at the AWS webinars on 1D sedimetn and 2D sediment transport, they discuss some of these matters further.
24	Very interesting talk Paul - thank you! I'm wondering how the model performed as compared to the observations during the dredging and also whether your work guided what observations were collected	The plume source rates we derived after the validation process (adjusting the rates in the model) did vary somewhat from the initial assumptions based on the pre-dredging impact assessment. We found that the plume generation rate in sandier material was lower than originally assumed, and in clayey material it was higher
25	Thank you for your presentation, Paul, (1) Do you think the dredging affects the water quality? (2) Did you observe increase in salinity through groundwater intrusion after dredging?	live answered
26	How long did the model in Abu Dhabi take? Did you use the HPC?if yes with how many cores? just curious.	live answered

Webinar: Applied Hydrodynamic Modelling – Part 1

#	Question	Answer
27	If TUFLOW model is free can you share the download link? or we have to pay ?	We have a demo model mode where you can run models less than 5000 cells for free. We also have a suite of free tutorial models that you can try TUFLOW out. Please email me at support@tuflow.com and we can send out some further information.